anticipated by Zimmerman et al. United States Patent 6,184,865.

Claims 1 to 4 in the original action have been canceled. The new claims 5 through 8 are submitted here with.

In the remarks that follow, applicant will first summarize the invention. This summary will start with generic claim 5. It will be pointed out that all claims relate to the calibration of an analog pointing device. In particular, it will be emphasized that the sensor plane provided in such pointing devices have varying X and Y electrical signals which require auto calibration to central pointing positions where no cursor motion is expected. Claim 6 will be shown to relate to the pointing device set forth in Figs. 1 through 4. Further, claim 7 will be shown to relate to the pointing device set forth in Figs. 5 through 7.

The Zimmerman patent will be shown not to consider that kind of auto calibration set forth in this invention. The Zimmerman patent will be shown to disclose a capacitance type pointing device where the auto centering different from that here disclosed and the clicking switch either indicates a conventional computer "click" or turns on the capacitance device in a power saving mode. Newly submitted claims 5 through 8 will be submitted as allowable over the Zimmerman prior art.

Invention Summarized

Pointing devices for use with computer interfaces are well known. Simply stated, such pointing devices have a central pointing position from which it is desired that no cursor movement be delivered to the computer interface. Further, when such pointing devices are displaced from their central pointing position, cursor movement is applied to the to the computer interface proportional to the displacement of the pointing device from its central pointing position. In the usual case, the further the displacement, the more rapid the pointing bias applied to the computer interface.

The type of pointing device here used has a contact which is moved by the pointer. This contact moves along a sensor surface. The problem is at the interaction between the sensor surface and the pointer actuated contact.

In the words of claim 5, the surface plane has a varying X and Y electrical

signal at various contact positions on a sensor surface. Stated in other words, the sensor surface is made of material having less than linear characteristics. Sensor surfaces on various pointer devices can be counted on differing one from another. The designer of such pointers cannot count on absolute uniformity of material and response of the sensor surfaces. For example, such nonuniform sensor surface are characterized by the "drift" set forth in specification. The problem becomes when and how to calibrate these devices.

Summarizing the invention of claim 5, the pointer has a sensor surface having a varying X and Y electrical signal at various contact positions on the sensor plane. A contact is actuated by the pointer for movement between contact positions along the sensor surface.

The pointer has a central pointing position to provide no cursor movement at the contact relative to the sensor surface. Conventionally, the pointer has positions displaced from the central pointing position to provide cursor movement at the contact relative to the sensor plane proportional to the displacement from the central pointing position.

Finally, in device set forth in the preamble of claim 5, the sensor surface and contact output an electrical signal with respect to the position of the contact between the sensor surface and the contact surface. Claim 5 then moves on to set forth a process of auto calibration for the pointing device.

First a set of suitable calibration parameters Xcenter and Ycenter are recorded at the point in time that a contact is first established between the sensor surface and the contact surface.

Second, X and Y signal values are measured at a subsequent particular point in time.

Third, the Xcenter and Ycenter values are subtracted from the X and Y signal values at that point in time.

Applicant submits that this claim is generic, and reads on the embodiment set forth in Figs. 1 to 4 and 3 to 7.

Summarizing the invention of claim 6, a dome switch is placed underlying

the sensor surface and acts as the contact surface. One type of user action frequently happens as follows: The user positions the cursor over a target, and then removes the finger from the stick in order to freeze the cursor at its target. The user then makes a quick and decisive click by applying increasing Z force to the stick. At first, the sensor surface comes in contact with the domeswitch/contact surface. Then, after a very short period of time, the Z force is increased to collapse the dome. Then, and only then, this adopting of new Xcenter, Ycenter values occurs. What applicants have found, is that the normal computer user when applying a "click" to such pointing device pushes straight down and centrally on to the sensor plane. This is done rapidly. And when it is done rapidly, that is the time to auto center the pointer device!

Summarizing the invention of claim 7, in this type of device, a central contact switch is placed on the contact surface. The calibration occurs when the sensor surface touches the central contact switch. Again, compensation occurs for sensor surfaces that are other than linear in their response.

Zimmerman Distinguished

Zimmerman' 865 relates to a pointing device of the type described. In Zimmerman, the pointing device is an object which varies capacitance at underlying capacitors to provide the pointing bias. However, this is as far as the similarity goes.

First, Zimmerman states: "The Center 90 [Zimmerman's name for what is referred to in this document as the point (Xcenter, Ycenter)] is updated when the articulating member 20 is undisturbed, that is, when no external force is applied." (See column 12, lines 18 to 23.) In the pointing devices for which this invention is applied, there is no signal to measure when no external force is applied, because the sensor surface is not touching the contact surface.

While it is true that Zimmerman discusses a click switch, it is used by him for two purposes: to implement a mouse click and to wake the device up. In this invention, the click switch shares the first purpose (to implement a mouse click), and, under special circumstances, to provide information for calibration.

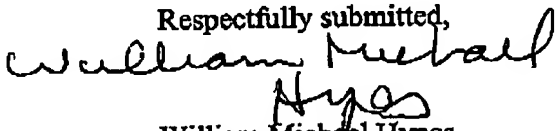
A devices like Zimmerman's capacitive apparatus, or other pointing sticks like IBM's Trackpoint III are always in "presence". They can be read at any time when the user is not touching the device with a finger to develop the (Xcenter, Ycenter) calibration parameters. This invention teaches three methods of establishing these parameters in a device which provides no data at all when it is not being touched.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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